

Configuration Manual

MSc Research Project Part 2
MSc. in Data Analytics

Sathwik Kataradahalli Sumanth
Student ID: x23416823

School of Computing
National College of Ireland

Supervisor: Prof. Eamon Nolan

National College of Ireland
MSc Project Submission Sheet
School of Computing



Student Name: Sathwik Kataradahalli Sumanth
Student ID: X23416823
Programme: MSc. in Data Analytics **Year:** 2025 - 2026
Module: MSc Research Project Part 2
Lecturer: Prof. Eamon Nolan
Submission Due Date: 28/01/2026
Project Title: Dynamic Pricing for Food Waste Reduction in Supermarkets Using Reinforcement Learning
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I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Sathwik Kataradahalli Sumanth

Date: 28/01/2026

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1 Prerequisites

Software

- Anaconda (Recommended), or Python 3.10 with venv.
- Jupyter notebook / Lab

Hardware

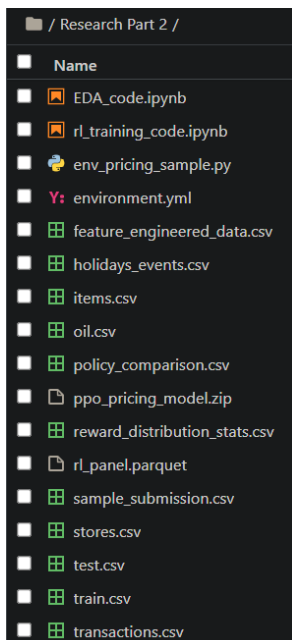
- Any recent CPU laptop/desktop; 8 GB RAM is recommended. GPU is not required.

Dataset Link

<https://www.kaggle.com/datasets/ruiyuanfan/corporacin-favorita-grocery-sales-forecasting>

2 Project files and layout

Place all the files in one folder (Research Part 2 in my case)



3 Environment setup

Option A: Minimal environment.yml

Create **Research Part 2/environment.yml**

Save the below code block in *environment.yml*

```
name: rl_pricing
channels:
  - conda-forge
dependencies:
  - python=3.10
  - pip
  - pip:
    - gymnasium
    - numpy
    - pandas
    - pyarrow                #parquet IO used in EDA/training
    - stable-baselines3
    - torch                  #SB3 PPO backend
    - jupyter
```

Then:

In Anaconda Command Prompt (cmd)

- cd Research Part 2
- conda env create -f environment.yml
- conda activate rl_pricing

Option B:

If environment.yml is already present:

In Anaconda Command Prompt

- activate rl_pricing
- jupyter notebook / python -m jupyter notebook

```
(base) C:\Users\suman>activate rl_pricing
(rl_pricing) C:\Users\suman>python -m jupyter notebook|
```

4 Data preparation (EDA→Panel)

Open *EDA_code.ipynb* and run all cells

It writes *rl_panel.parquet* in the same working folder and prints “Saving RL panel to: rl_panel.parquet.... Saved: rl_panel.parquet”.

5 RL Training

With the environment still active, open *rl_training_code.ipynb*.

The notebook imports PricingEnv from *env_pricing_sample.py*, reads *rl_panel.parquet*, shows its shape, creates the environment, and trains PPO.

6 Configuration knobs (what can be changed)

All of the configuration for the simulation comes from the environment constructor in *env_pricing_sample.py*

```
def __init__(
    self,
    df: pd.DataFrame,
    price_multipliers=None,
    base_price=1.0,
    elasticity=0.8,
    shelf_life=3,
    safety_stock_factor=1.3,
    waste_penalty=2.0,
    max_inventory=10_000,
    random_seed=None,
):
```

7 Common issues and fixes

File not found: *rl_panel.parquet*

Run *EDA_code.ipynb* first to generate it, or place the parquet beside the training notebook.

Parquet engine error (e.g. “Unable to find a usable engine; tried 'pyarrow', 'fastparquet'”)

Ensure pyarrow is installed, both EDA and training use parquet IO.

ImportError: No module named 'env_pricing_sample'

Keep *env_pricing_sample.py* in the same directory as the training notebook.

SB3 / Torch missing

Use the provided *environment.yml* which includes stable-baselines3 and torch.